
Space Weather Forecast

Issued on Wednesday, 17 July 2024 at 13:27 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: High to Moderate activity, with further Moderate class flares expected, and a chance of Strong class flares. Chance of G1 Minor Storms late day 3 or more likely day 4 (19-20 Jul) due to Coronal Mass Ejection arrival

Analysis of Space Weather Activity over past 24 hours

Solar Activity: High with a Strong flare (X-class) observed at 16/1326 UTC, from the large sunspot now on the southwest limb and moving onto the far side. Moderate flares were also observed from the sunspot regions on the northwest disc at 16/2124 UTC, in the north-centre disc at 16/2206 UTC and from the southwest at 17/0639 UTC. There are a total of nineteen sunspots on the disc. These are all generally small and relatively simple, with the most complex spot in the southwest. This has a potential instability with two opposite polarity regions within the same spot, but has remained stable so far.

A series of coronal mass ejections (CMEs) were observed. The first, from the strong-flare, is a clear miss, passing ahead of Earth. The second, was comprised of two components. The first, a weak "halo" CME straight towards Earth, and the second to the northeast. These have both been attributed to the Moderate flare at 16/2206 UTC. These are both Earth-directed but rather slow, and of uncertain impact, likely arriving very late on day 3 (19 Jul) or early day 4 (20 Jul). A further CME likely also likely occurred with the later Moderate flare, however available imagery currently remains inconclusive.

Solar Wind / Geomagnetic Activity: The solar wind was generally at background. Wind speed briefly rose to 410km/s 16/2000-17/000 UTC, but otherwise was generally around 350km/s. Interplanetary magnetic field (IMF), Bt, was initially Moderate, but eased from 16/1605 UTC to be Background to Moderate, and the north-south component was initially Moderately positive (northward), but eased after 16/1605 UTC to be more variable between Weak and brief Moderate values. Geomagnetic activity was Quiet to Unsettled (Kp 1-3).

Solar Radiation: The count rate of energetic particles (High energy protons) remained at background with no solar radiation storms occurring

Four-Day Space Weather Forecast Summary

Solar Activity: High to Moderate activity with further Moderate class flares likely, and a chance of Strong-class flares, mainly day 1.

Solar Wind /Geomagnetic Activity: The CMEs from the Moderate flare at 16/2206 UTC been assessed as Earth-directed, likely arriving late on day 3 or early day 4 (19-20 Jul). Any fast wind from the large northern coronal hole is most likely to remain north of Earth, but with the potential for slight enhancements day 1-3 (17-19 Jul), with a chance of brief spells of slightly elevated winds. Geomagnetic activity is expected to be mostly Quiet to Unsettled, but with a slight chance of Active and very slight chance of G1 Minor Storm intervals days 1-3 (17-19 Jul). Any CME arrival is then expected to increase activity to Active with likelihood of G1-G2 Minor to Moderate Storm intervals, most likely late on day 3 or day 4 (20 Jul).

Energetic Particles / Solar Radiation: The count rate of energetic particles (High energy

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protons) is likely to remain at background with no solar radiation storms expected. However, any notable flares will bring the potential for this to rise, with a slight chance of reaching the S1 Minor Solar Radiation Storm level.

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	5	5	20	60
Strong	G3	No	1	1	1	5
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	Yes	80	75	70	70
Very Active	R3 to R5 X	Yes	25	15	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	20	20	10	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm⁻²sr⁻¹s⁻¹)